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Specification and Drawing, as originally filed, with Application for Patent Serial No: **2,353,051**, on July 12, 2001, by **INNOVA CORP.**, assignee of Avi Shelemay, for "Implant for Use in Aesthetic Regions of the Mouth".

L. Rigembal

Agent certificateur/Certifying Officer

December 17, 2003

Date

Canada

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OPIC CIPO

IMPLANT FOR USE IN AESTHETIC REGIONS OF THE MOUTH

SCOPE OF THE INVENTION

The present invention relates to an "aesthetic dental implant" to be used in areas in the mouth with high aesthetic concerns.

BACKGROUND OF THE INVENTION

United States Patent No. 5,344,457 to Pilliar et al., entitled "Porous Surfaced Implant", discloses a frustoconical shaped implant which is characterized by a porous coated lower portion and a smooth non-porous upper bone attachment region or collar. The implant which is the subject of United States Patent No. 5,344,457 has achieved a significant degree of success in the market place, and is presently sold by Innova Corp. of Toronto, Canada, under the name Endopore®. Endopore® dental implants are used in the replacement of various teeth including, lost molars and bicuspid teeth in the anterior and posterior regions of the mouth.

A difficultly with conventional implants exist in that todate, conventional implants have achieved limited success in replacing incisors and teeth in the frontal-most regions of the mouth where high aesthetic demands exist.

SUMMARY OF THE INVENTION

The present invention is directed to an improved dental implant which is suitable for use in aesthetic regions of the mouth, including as replacement for upper incisor teeth, and has been developed as a modification of the Endopore® implant. The design features of the present implant rely on the biological principles governing crestal bone remodeling and biological width formation around implants.

Traditionally dental implants are placed in the alveolar bone in two stages. During the first stage surgery, the implant fixture is submerged in the bone to the level of its platform. Crestal bone loss or saucerization around implants has been noted to develop about 6 months following abutment connection in a second stage surgery. The abutment-implant interface, also termed "microgap", is believed to harbor bacteria and bacterial products following exposure to the oral environment. This in turn results in the establishment of a "biological width" around the implant (i.e. the distance from the peri-implant bone crest to the microgap). The biological width is relatively constant and seems to range between 1.5 and 2 mm, similar to the biological width present around natural teeth.

Another variable that plays a role in crestal bone remodeling is lack of mechanical coupling around the smooth collar surface. It has been demonstrated that the crestal bone resorption around Endopore® implants stops at the junction of the smooth collar and the porous surface. It has been suggested that the lack of mechanical coupling around the smooth collar surface results in "disuse atrophy" of the crestal bone to the level the junction with the porous surface. This has been demonstrated also with other textured implant surfaces.

Crestal bone loss around dental implants has lead to an aesthetic challenge when attempting dental restorations using two implants positioned adjacent to each other. Loss of inter-implant bone height (as a result of the normal crestal bone remodeling that is associated with each of the implants) results in the absence of a papilla between the two implants due to lack of bone support. This creates an aesthetic deformity, often termed "black triangle", between the two implant crowns. "Black triangles" are particularly visible when present in the maxillary anterior region and the patient has a high lip line. The patient's perception of a successful implant-supported prosthesis depends not only on restoring function, but also on restoring normal anatomy and aesthetics. Lack of a papilla and the presence of a "black triangle" can lead to patients' dissatisfaction with the whole implant treatment, even patients with low smile line. Heretofore, the dental profession has been forced to come up with techniques to deal with "black triangles". Most commonly, pink acrylic or porcelain is added to the final restoration to replace the missing papilla. This solution is far from ideal since it is impossible to replicate the gingival

tissue with acrylic or porcelain in terms of texture and colour. Several attempts have also been made in establishing surgical procedures that will regenerate the missing papilla; however, these procedures are very unpredictable and seldom result in 100% regeneration.

The "aesthetic implant" design features of the present invention are therefore based on the principles governing peri-implant crestal bone loss, and aim at maintaining the interproximal bone at a level that is coronal to the buccal and lingual bone levels. The implant is designed to be inserted in a single stage surgery, thereby ensuring adequate biological width between the microgap and the crest of the bone. Additionally, the implant is designed to be "press-fit" in a specific buccal/lingual and mesial/distal orientation.

BRIEF DESCRIPTION OF THE DRAWING

Reference may be now had to the accompanying detailed description, together with the accompanying drawing page in which:

Figure 1 shows a schematic side and plan illustration of an implant construction in accordance with a preferred embodiment of the invention.

DETAILED DESCRIPTION OF THE PREFERED EMBODIMENT

As shown best in Figure 1, the present invention relates to a dental implant onto which a suitable prosthesis is to be attached. The implant is characterized by a tapered frustoconical body having two principle portions or surfaces, namely a lower or apical porous coated surface for primary fixation of the implant (i.e. bone-engagement), as well as a non-porous smooth upper or coronal surface. The coronal upper surface is provided to prompt the maintenance of bone surrounding the surface of the implant.

It is to be appreciated that the porous surface of the bone-engaging region of the implant may be in the form of a coating comprised of discrete particles adhered to the implant surface

into which the implant may grow. Most preferably, the porous surface comprises a porosity of from about 10 to 800 microns, with the porous coated surface having a porosity similar to that of the Endopore® implants however, differing porosities are also possible. Alternately, the porous coated region could be formed by mechanical abrasion, or a roughened portion of the implant.

As shown best in Figure 1, the porous coated lower portion is characterized by two upwardly extending regions, whereby the porous coated surface extends an increased distance upwardly from the bottom apex implant towards its upper rim. Each of the upwardly extending porous regions are provided on opposing peripheral sides of the implant body.

Although not essential, the smooth non-porous coronal portion of the implant is also raised in a corresponding manner, so as to follow the uppermost edge of the porous region as smooth band having a substantially constant width. It is to be appreciated, however, that a coronal portion could also be provided which narrows in width at each raised region of the porous surface of the implant.

The implant is constructed such that it may be placed in a press-fit manner with the raised portions of the porous and coronal portions oriented in the distal and mesial regions, and the buccal and lingual edges of the positioned implant characterized by the porous coated regions of shorter length.

Similarly, while it may be preferred that the implant include two opposed raised porous regions on both the buccal/lingual edges of the implant, the invention is not so limited. If desired, the implant could be modified to include only a single raised portion where for example, the implant is to be placed in a position interposed between a natural tooth and a second implant. In this construction the raised portion of the porous surface would be located adjacent to the second implant alone. Alternately, it is envisioned that the implant having two or more non-opposed discrete raised porous portions could be provided for specific orientation where the loss of supporting bone height may otherwise occur.

In general, the design features of a preferred implant are as follows:

Design features

- The implant platform is curved or follows a similar from where the buccal/lingual edges of the platform are more apical relative to the mesial/distal by 2 to 4 mm. Therefore, the implant has to be "press fitted" in a specific buccal/lingual and mesial/distal orientation.
- The implants smooth collar is 1.5-2 mm wide, and it follows the curvature of the platform.
- The porous coating follows the same curvature as the smooth collar surface.
- The implant can be offered in the same diameters and lengths as the Endopore® implants.

Although the preferred embodiment of the invention describes and illustrates various preferred aspects of the invention, the invention is not so limited. Many modifications and variations will now occur to persons skilled in the art.

We claim:

1. An implant for insertion into bone through an epithelial and fibrous connective tissue, and useful to connect a prosthesis thereto, the implant comprising:

a top portion for supporting a mechanical component to which the prosthesis may be connected; and

a body comprising a substantially smooth upper region and a lower porous surface, the porous surface portion of the body extending upwardly at one or more discrete locations, relative to the top portion.

2. The implant as claimed in claim 1 wherein said body tapers at an angle of between about 2 and 10 degrees.

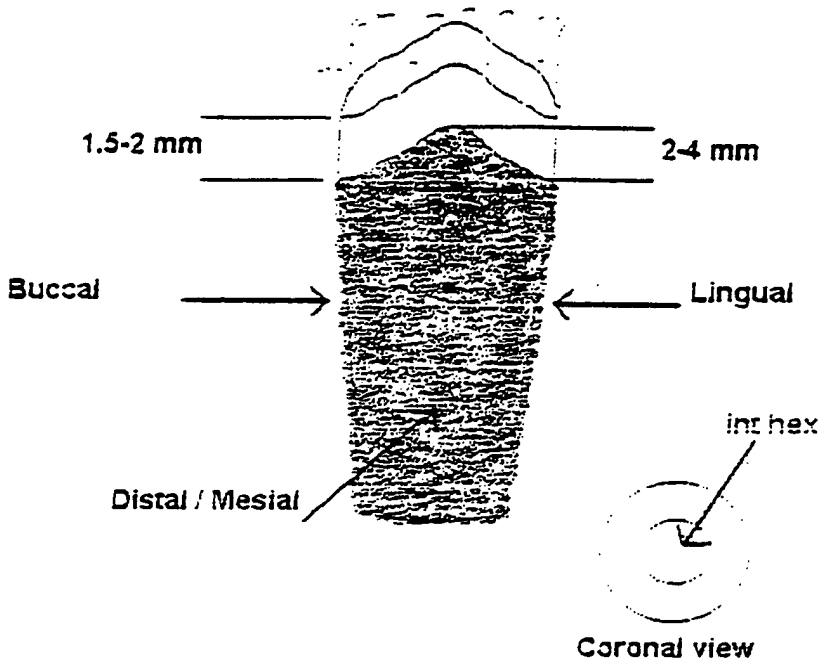

FIGURE 1